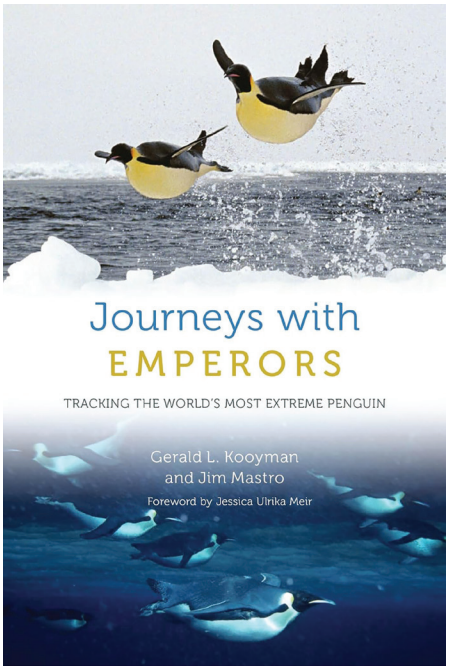
Journeys with Emperors: Tracking the World's Most Extreme Penguin. By Gerald L. Kooyman and Jim Mastro. 2023. The University of Chicago Press. (ISBN 9780226824383). 165 pp. Hardcover, $32.50. Ebook also available.



Animal facts are ubiquitous in pop culture, but the science and process to determine many of those interesting facts goes unnoticed or unappreciated. Reading *Journeys with Emperors* gave me a new appreciation for the challenges many wildlife biologists face to answer seemingly simple questions.

To study emperor penguins on the ice shelves of Antarctica requires only a little less preparation than a journey to the moon. The first half of the book is part science journal and part memoir of the challenges and successes of researching the remote colonies of emperor penguins in the Ross Sea. Each chapter is full of adventure and description of how to best investigate the lives of penguins and supplemented with links to videos from the experience. Where do they go after the breeding season? How deep can they dive? What do they eat? The authors explain and explore how they investigated and discovered these questions and the many challenges and failures that occurred to get them. At times the narrative gets a bit repetitive, but overall it reads like a journal full of nuanced reflection and specific details.

The second half of the book dives into the amazing world of emperor penguin biology and physiology. These birds are cool! There are ample opportunities for teachers to take a deep dive with penguin physiology to better understand respiration and metabolism as these birds break through the challenges of diving over 500 m in frigid waters. You will also learn why emperor penguins could be called "marine owls" for their amazing senses and hunting prowess deep in the depths of the Southern Ocean. *Journeys with Emperors* is a fun read that won't leave you with cold feet.

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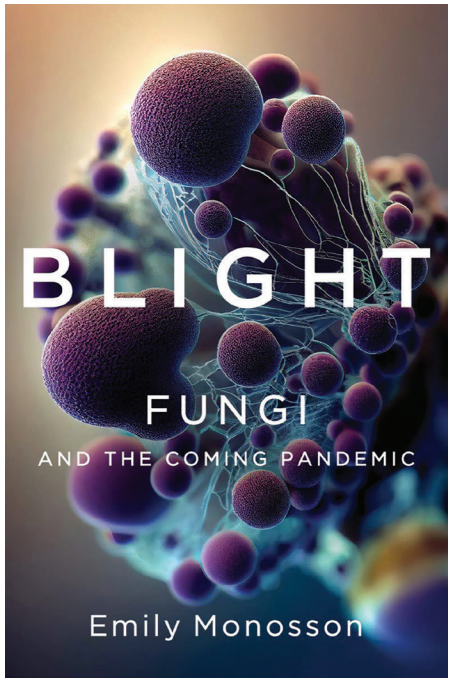
Blight: Fungi and the Coming Pandemic. By Emily Monosson. 2023. W. W. Norton. (ISBN 1324007012). 272 pp. Hardcover, $28.95. Audiobook also available.

Several of my children's classmates have been wearing cute mushroom caps to school. Biomedical startups are testing psilocybin extracts for psychotherapy.



Abutting the yogurt aisle of the grocery store, I could buy several different brands of fungus-infused tea (though I've yet to discover why I would). It's been the better part of a century since Gordon Wasson began categorizing human cultures as either "mycophobic" or "mycophillic," and almost 40 years since the famous plumbers Mario and Luigi began using *Amanita muscaria* to embolden themselves (much as the Koryak and Sámi peoples have used these mushrooms on ceremonial occasions), but now, finally, fungi seem to have entered the limelight of American popular culture.

At the same time, toxicologist Emily Monosson has published a chilling text on the ways that our cultural habits have put us in the path of deadly fungal epidemics. We may be careening toward a

The American Biology Teacher, Vol. 86, No. 6, pp. 385–387, ISSN 0002-7685, electronic ISSN 1938-4211. DOI: https://doi.org/10.1525/abt.2024.86.6.385.

future of crop failures and incurable diseases, and few people seem to recognize the risk. The problem, as in so many of our contemporary calamities, is that the harms caused by current cultural practices would befall us all, but the benefit to doing things in the current way accrue to individuals.

Consider the banana. Such a magnificent fruit! They can be shipped slowly by boat, and they're both delicious and good for you. Given that banana plants rarely produce fruit in my hometown, I'm so glad that people nearer the equator grow bananas and sell them to me.

But if I decided to purchase a huge swath of South American forest, cut down all the vegetation, then planted a monoculture of bananas, I'd be creating a lot of harm. And it's not just the loss of biodiversity. The very existence of a dense monoculture offers an excellent evolutionary breeding ground for any parasite able to exploit that type of banana. My new plantation would increase the risk to that banana species all over the world, for everyone. And this has happened before. Until the 1950s, almost all banana plantations grew monocultures of the "Big Mike" banana—until an outbreak of fungus killed them all. Now banana plantations grow monocultures of the "Cavendish" banana, but a fungal infection might soon kill these plants, too.

By providing a substrate for fungal evolution, dense monoculture plantations seem like a terrible idea. But a dense monoculture is so much more efficient to manage, harvest, and ship from. By growing bananas this way, I'd make so much more profit than if I had the same number of bananas spread among other plants, or if I were growing a mix of several varieties of banana.

Mixed planting is better for the environment. It's better for anyone who might hope to grow bananas in the future. And it's arguably better for consumers, too, who would be healthier if they could choose from among many types of fruits and vegetables to eat. But those are all benefits for *other people*. Whereas the profit is private. Any rational person who's taken even an introductory-level economics course should know what to do: plant a monoculture and just hope that nobody else's monoculture incubates a deadly pathogen.

Given the way that we've structured economies and political systems all over the world, this sort of behavior will continue. Without changing the system, the only way we have to combat this behavior is through targeted taxation: using government policy to impose a monetary cost that would reflect the cost of our behavior to others. But the individuals who best understand what's at stake often have a monetary incentive to oppose taxation, and so we get inaction. Given all the problems in the world today, it would be difficult to convince the public that diversifying monocultures should be a top priority, especially since this would increase food prices.

Monosson discusses a similar risk related to climate change. There's a speculative theory that the rise of mammals was enabled in part by fungal infections that beset terrestrial reptiles: mammalian body temperatures are significantly higher than reptiles, which inhibits the growth of most types of fungus. (Today, the most at-risk mammals are those that hibernate, such as bats, whose bodies can become riddled with fungal hyphae when their body temperatures drop in winter.)

With climate change, though, many environments are warming, which puts selective pressure on saprophytic fungi to grow at higher temperatures. If any fungus evolved to grow at our near our own body temperatures, we humans would be in such danger.

But, again, the actions that contribute to climate change all produce *individual* gains. There are the various destructive policies that corporations adopt for the sake of greater profits. Also, consider the patterns of consumption that we all engage in: plastics are so convenient, traveling by plane is so fast, and buying stuff feels nice! Every decision that increases the risk of climate change also benefits the person who's making the decision, and, for each individual, the benefit is bigger than the risk. It's only in aggregate that our decisions would seem foolish.

Monosson also discusses other topics related to fungi, such as the wild animal trade, the spread of dangerous candida infections through hospitals, and more, which can admittedly feel overwhelming to think about. In some ways, *Blight* is a bleak book, but it's also fascinating. And we need to know about these things—and be willing to educate others around us—if we want anything to change.

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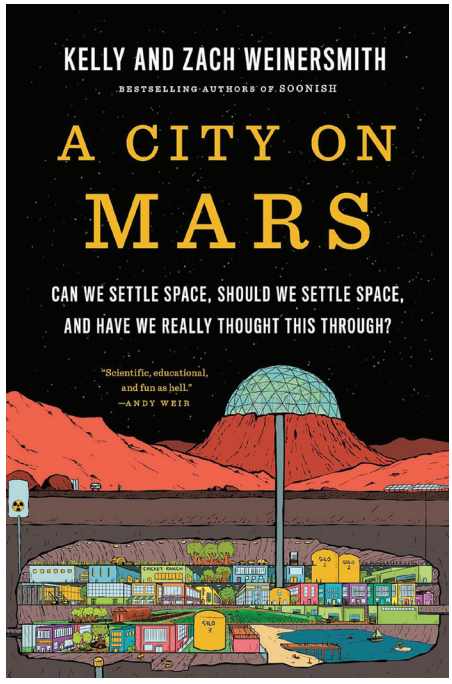
A City on Mars: Can We Settle Space, Should We Settle Space, and Have We Really Thought This Through? By Kelly and Zach Weinersmith. 2023. Penguin Press. (ISBN 978-1-984-88172-4.) 448 pp. Hardcover, $32.00.



A City on Mars, as its subtitle suggests, presents a generally skeptical view of the prospects for human settlement of space. But the book is anything but solemn. As in their previous book, *Soonish: Ten Emerging Technologies That'll Improve and/or Ruin Everything* (2017), the Weinersmiths play to their strengths—Kelly is a behavioral ecologist specializing in parasitism; Zach is a web cartoonist responsible for the reliably nerdy Saturday Morning Breakfast Cereal—by providing a well-researched and often hilarious discussion of a variety of scientific issues of wide interest.

Only about half of the book actually addresses scientific issues, with discussions of human physiology, sex, and psychology in space; possible human environments in space; and the challenges of maintaining "a human terrarium that isn't all that terrible" in such environments. Throughout, the Weinersmiths offer a thoughtful review of scientific studies of the ability of humans to flourish in various suggested off-Earth environments, often drawing attention to the lack of relevant research. And, of course, they do so with humor. At one point, for example, they summarize a number of